Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for predicting an unknown value of an internal composition characteristic of a velvet test antler of an animal, comprising the steps of:

a) selecting a sample population from a group of antlers;

b) obtaining at least one infrared thermographic sample image of each sample antler in the sample population, from at least one view, wherein the sample image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the sample image;

c) calculating a value of at least one statistical measure of the temperature data for the sample image, wherein the value is treated as the known temperature input variable;

d) conducting an assay to obtain ~~the~~ a known value of the composition characteristic;

e) determining a relationship between the known temperature input variable and the known value of the composition characteristic, thereby generating a predictive model to predict the unknown value of the same composition characteristic in a test antler not selected from the sample population;

f) obtaining at least one infrared thermographic test image of the test antler, from at least one view, wherein the test image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the test image;

g) calculating a value of at least one statistical measure of the temperature data for the test image;

h) using the predictive model, wherein the unknown value of the composition characteristic is treated as an output variable, and the statistical measure of temperature data for the test image is treated as an input variable; ~~and~~
i) solving the predictive model to provide the predicted value of the composition characteristic of the test antler, and
j) outputting the predicted value of the composition characteristic of the test antler to a computer, memory, display or printer.

2. (Original) The method of claim 1, wherein the composition characteristic is selected from the group consisting of moisture content, ash content, protein, fat, amino acids, growth factors, and location and amount of calcification.

3. (Original) The method of claim 1, wherein the composition characteristic is ash content.

4. (Currently amended) The method of claim 2, ~~further comprising~~ which may further comprise the step of including in the predictive model, one or more non-temperature input variables not derived from infrared thermography.

5. (Currently amended) The method of claim 4, wherein the one or more non-temperature input variables are selected from the group consisting of animal weight, animal age, species type, genetic breed, antler length, antler width, antler circumference, antler geometric measure, antler surface to volume ratio, button drop dates, time of year, and photoperiod.

6. (Previously presented) The method of claim 42, wherein the animal is selected from the group consisting of *Cervus elaphus manitobensis*, *Cervus elaphus nelsoni*, *Cervus elaphus roosovelti*, *Cervus elaphus scoticus*, *Cervus elaphus xanthopygus*, *Cervus canadensis*, *Cervus hortulorum*, *Cervus nippon*, *Cervus*

timorensis russa, *Cervus unicolor*, *Cervus timorensis*, *Cervus mariannus*, *Cervus duvauceli*, *Cervus schomburgki*, *Cervus eldi*, *Cervus albirostris*, *Alces alces*, *axis axis*, *Blastocerus dichotomus*, *Capreolus capreolus*, *dama dama*, *Elaphurus davidianus*, *Hippocamelus antisensis*, *H. bisulcus*, *Mazama americana*, *M. gouazoubira*, *M. rufina*, *M. chunyi*, *Odocoileus hemionus*, *Odocoileus virginianus*, *Ozotoceros bezoarticus*, *Pudu pudu*, *Pudu mephistophiles*, and *Rangifer tarandus.*

7. (Currently amended) The method of claim 43, wherein the view of the sample and test image is a dorsal, lateral, distal, or proximal view.

8. (Currently amended) The method of claim 7, wherein the statistical measure for the sample and test image is selected from the group consisting of a measure of central tendency, a measure of dispersion, and a total temperature.

9. (Currently amended) The method of claim 7, wherein the statistical measure for the sample and test image is the mean temperature.

10. (Original) The method of claim 8, wherein the relationship between the known input variable and the known value for the composition characteristic is determined by a statistical technique selected from the group consisting of multiple linear regression, cluster analysis, discriminate analysis, curve fitting, ranking and artificial neural network learning, Spearman ranking, and visual subjective scores.

11. (Currently amended) The method of claim 10, wherein the sample and test ~~image is~~ images are obtained from the sample and test antler *in vivo* or *in vitro.*

12. (Currently amended) The method of claim 10, wherein the ~~image is obtained from the antler *in vivo* or *in vitro* and when~~ sample and test images are obtained from the sample and test antler *in vitro*, and are subjected to a temperature change.

13. (Original) The method of claim 12, wherein the temperature change is cooling.

14. (Original) The method of claim 12, wherein the temperature change is warming.

15. (Currently amended) The method of claim 13, further comprising the steps of:
I) obtaining the sample and test images of the sample and test antler ~~image of the antler *in vitro*~~ from at least one view, within a first time period after removal from the animal;
II) obtaining at least one second infrared thermographic sample and test image of the sample and test antler ~~*in vitro*~~ from the same view as in step (I) at a second time period after cooling of the sample and test antler;
III) calculating a value of at least one statistical measure of the temperature data for the first sample and test images and for the second sample and test images ~~image and the second image~~, wherein the temperature data for the sample and test images represent one or more sites within the sample and test antler;
IV) calculating a value of a temperature change at the one or more sites within the sample and test antler;
V) ~~using~~ generating the predictive model~~, wherein~~ using the value of the temperature change ~~is treated~~ as an additional input variable; and
VII) solving the predictive model to identify the composition characteristic at the one or more sites ~~of high calcification and low metabolic activity~~ within the test antler.

16. (Currently amended) The method of claim 14, further comprising the steps of:

I) obtaining the sample and test images of the sample and test antler ~~image of the antler *in vitro*~~ from at least one view, within a first time period after freezing of the sample and test antler;

II) obtaining at least one second infrared thermographic sample and test image of the sample and test antler ~~*in vitro*~~ from the same view at a second time period after warming of the sample and test antler;

III) selecting one or more sites within the sample and test antler for analysis of temperature data;

IV) calculating a value of at least one statistical measure of the temperature data at the one or more sites in the first sample and test images and for the second sample and test images ~~image and the second image~~;

V) calculating a value of a temperature change at the one or more sites within the sample and test antler; and

VI) ~~using~~ generating the predictive model~~, wherein~~ using the value of the temperature change ~~is treated~~ as an additional input variable; and

VII) solving the predictive model to identify the composition characteristic at the one or more sites ~~of high calcification and low metabolic activity~~ within the antler.

17. (Currently amended) The method of claim 11, further comprising the step of using the predicted value of the composition characteristic of the test antler to make a map of the test antler, wherein the map indicates sites of high and low levels of the composition characteristic within the antler.

18. (Currently amended) The method of claim 11, further comprising the step of comparing the predicted value of the composition characteristic of the test antler to a pre-determined value of the composition characteristic to determine optimal harvest timing.

19. (Original) The method of claim 18, wherein the composition characteristic is ash content.

20. (Currently amended) The method of claim 11, further comprising the steps of:
i) using the predictive model to determine a physical volume of one or more sites of low temperature for the sample and test antler;
ii) determining the physical volume of the sample and test antler; and
iii) calculating the percentage by volume of the sample and test antler displaying the one or more sites of low temperature.

21. (Currently amended) A method for ~~predicting~~ generating a comparative value of an internal composition characteristic of a test velvet antler, comprising the steps of:
a) obtaining at least one infrared thermographic image of the test antler, from at least one view, wherein the test image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the test image; and
b) ~~scoring the image by~~ comparing the temperature information of the test image to ~~the~~ temperature information of a corresponding sample image of ~~an~~ a sample antler with a known value for the composition characteristic in order to generate a comparative value of the composition characteristic of the test antler; and
c) outputting the comparative value of the composition characteristic from step (b) to a computer, memory, display or printer.

22. (Currently amended) The method of claim 21, wherein ~~scoring~~ comparing is conducted visually or by computing means.

23. (Original) The method of claim 22, wherein the composition characteristic is ash content.

24. (Currently amended) The method of claim 4445, wherein the animal is selected from the group consisting of *Cervus elaphus manitobensis*, *Cervus elaphus nelsoni*, *Cervus elaphus roosovelti*, *Cervus elaphus scoticus*, *Cervus elaphus xanthopygus*, *Cervus canadensis*, *Cervus hortulorum*, *Cervus nippon*, *Cervus timorensis russa*, *Cervus unicolor*, *Cervus timorensis*, *Cervus mariannus*, *Cervus duvauceli*, *Cervus schomburgki*, *Cervus eldi*, *Cervus albirostris*, *Alces alces*, *axis axis*, *Blastocerus dichotomus*, *Capreolus capreolus*, *dama dama*, *Elaphurus davidianus*, *Hippocamelus antisensis*, *H. bisulcus*, *Mazama americana*, *M. gouazoubira*, *M. rufina*, *M. chunyi*, *Odocoileus hemionus*, *Odocoileus virginianus*, *Ozotoceros bezoarticus*, *Pudu pudu*, *Pudu mephistophiles*, and *Rangifer tarandus*.

25. (Previously presented) The method of claim 45, wherein the view of the image is a dorsal, lateral, distal, or proximal view.

26. (Currently amended) A method for predicting maturity of a velvet test antler *in vivo*, comprising the steps of:
a) at a first time period, obtaining at least one infrared thermographic first time tip image of the tip of the test antler, and at least one infrared thermographic first time base image of the base of the test antler, from at least one view, wherein each first time tip and base image of the test antler is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the first time tip and base ~~image~~ images;
b) at a second time period, obtaining at least one infrared thermographic second time tip image of the tip of the test antler, and at least one infrared thermographic second time base image of the base of the test antler, from the same view as in step a);

c) calculating a value of at least one statistical measure of the temperature data from the first and second time tip images and calculating a value of at least one statistical measure of the temperature data from the first and second time base images ~~of the tip of the antler and the base of the antler, at the first time period and the second time period~~;

d) based on the values from step c), calculating a value of the temperature change of the tip of the test antler and the base of the test antler at the first and second time periods; ~~and~~

e) outputting the values from step (d) to a computer, memory, display or printer; and

f) harvesting the test antler before the temperature change of the tip of the test antler is equal to the temperature change of the base of the test antler.

27. (Previously presented) The method of claim 46, wherein the animal is selected from the group consisting of *Cervus elaphus manitobensis*, *Cervus elaphus nelsoni*, *Cervus elaphus roosovelti*, *Cervus elaphus scoticus*, *Cervus elaphus xanthopygus*, *Cervus canadensis*, *Cervus hortulorum*, *Cervus nippon*, *Cervus timorensis russa*, *Cervus unicolor*, *Cervus timorensis*, *Cervus mariannus*, *Cervus duvauceli*, *Cervus schomburgki*, *Cervus eldi*, *Cervus albirostris*, *Alces alces*, *axis axis*, *Blastocerus dichotomus*, *Capreolus capreolus*, *dama dama*, *Elaphurus davidianus*, *Hippocamelus antisensis*, *H. bisulcus*, *Mazama americana*, *M. gouazoubira*, *M. rufina*, *M. chunyi*, *Odocoileus hemionus*, *Odocoileus virginianus*, *Ozotoceros bezoarticus*, *Pudu pudu*, *Pudu mephistophiles*, and *Rangifer tarandus*.

28. (Currently Amended) The method of claim 47, wherein the view of each of the first and second time tip and base images ~~the image~~ is a dorsal, lateral, distal, or proximal view.

29. (Currently amended) The method of claim 28, wherein the statistical measure for each of the first and second time tip and base images is selected from the group consisting of a measure of central tendency, a measure of dispersion, and a total temperature.

30. (Currently amended) The method of claim 28, wherein the statistical measure for each of the first and second time tip and base images is the mean temperature.

31. (Canceled)

32. (Canceled)

33. (Canceled)

34. (Canceled)

35. (Currently amended) An apparatus for predicting an internal composition characteristic of a velvet antler comprising:

a) image acquisition means for scanning a ~~the~~ live animal or harvested antler from at least one view to obtain at least one infrared thermographic image of the animal or antler, whereby each image is represented as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image; and

b) computing and storing means for:

i) storing each image as an array of pixels providing temperature data representative of temperature information at the corresponding part of the image;

ii) calculating a value of at least one statistical measure of the temperature data for each thermographic image;

iii) providing a predictive model, whereby the composition characteristic is treated as an output variable, and the statistical measure of temperature data is treated as an input variable; and

iv) solving the predictive model to provide the value of the composition characteristic; and,

c) output means for ~~furnishing~~ outputting the value of the composition characteristic for the antler to a computer, memory, display or printer.

36. (Original) The apparatus of claim 35, wherein the composition characteristic is selected from the group consisting of moisture content, ash content, protein, fat, amino acids, growth factors, and location and amount of calcification.

37. (Original) The apparatus of claim 35, wherein the composition characteristic is ash content.

38. (Currently amended) The apparatus of claim 36, further comprising one or more non-temperature input variables not derived from infrared thermography.

39. (Currently amended) The apparatus of claim 38, wherein the one or more non-temperature input variables are selected from the group consisting of animal weight, animal age, species type, genetic breed, antler length, antler width, antler circumference, antler geometric measure, antler surface to volume ratio, button drop dates, time of year, and photoperiod.

40. (Original) The apparatus of claim 38, wherein the statistical measure is selected from the group consisting of a measure of central tendency, a measure of dispersion, and a total temperature.

41. (Original) The apparatus of claim 38, wherein the statistical measure is the mean temperature.

42. (Previously presented) The method of claim 5, wherein the animal is of the family Cervidae.

43. (Previously presented) The method of claim 42, wherein the animal is of the species *Cervus elaphus*.

44. (Currently amended) The method of claim ~~23~~ 21, wherein the animal is of the family Cervidae.

45. (Previously presented) The method of claim 44, wherein the animal is of the species *Cervus elaphus*.

46. (Previously presented) The method of claim 26, wherein the animal is of the family Cervidae.

47. (Previously presented) The method of claim 46, wherein the animal is of the species *Cervus elaphus*.